CQ-TV MAGAZINE No. 116

BRITISH AMATEUR TELEVISION CLUB

NOVEMBER 1981

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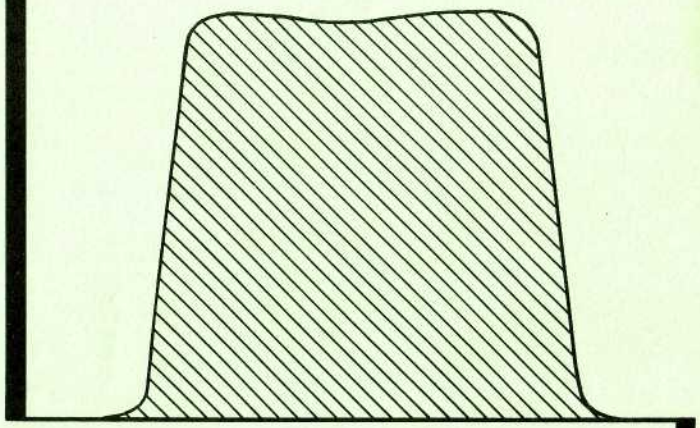

BANDPASS FILTER

also .....

THE PRESIDENT.
B.A.T.C. LEICESTER EXHIBITION.
FORTOP TVT432 TV TRANSMITTER REVIEWED.
¾W ATV LINEAR AMPLIFIER.
VIDEO INVERTER.
AN RF PROBE.
PLUS ALL THE REGULAR FEATURES.....

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MEMBERSHIP

ENROLMENT FEE 50p. This applies also to persons re-joining the club after an elapsed subscription. FULL YEAR £3. April to December £2.25p. July to December £1.50p. October to December 0.75p. All subscriptions fall due on the first of January each year. Overseas applicants should not send foreign cheques please.

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CLOSE FOR PRESS DATE FOR THE FEBRUARY 1982 ISSUE.....20th Dec. 1981.

THE BATC WISHES ALL ITS MEMBERS A VERY HAPPY CHRISTMAS.

EDITORS POSTBAG

Dear ED,

I have recently seen the BATC video tape programmes and was very impressed with them. The BATC programme was particularly well put together.

I showed the tape to the Salisbury Radio & Electronics Society and managed to get about thirty people along to watch it, (this represents about 75% of our membership) which was a good turn-out considering it was the holiday period and I only gave three days notice of showing.

I am sure we have now got a few people interested in ATV and I hope that when I return from VK next year there will be one or two people who will be able to exchange pictures in this area.

Neil Underwood, G4LDR
Salisbury, Wilts.

Dear ED,

I am not a professional in the television field but only an amateur with a great interest in colour TV in general. It may be interesting to you to know that I have been working for two years on a SECAM to PAL converter which works well and whose description should be (I hope!) available late this year. It employs a 21 x 10cm (9"x4") double sided PCB and uses 14 ICs and about 11 transistors to decode PAL or SECAM and to code into PAL. At this moment I am very busy designing the PCB, the next step will be a SECAM coder. At home I make all my recordings in PAL on a VHS machine. In the future I plan to convert my old home-made pattern generator into a special effects generator, which is easier in PAL than SECAM.

Alain Picaud, F6BFY

Editors note:

An article on this subject will be in a future issue of CQ-TV.

Dear ED,

The following item concerning Narrow Band TV in Holland may be of interest to your members.

The Dutch NBTVA section has now become part of "Veron" (the Dutch RSGB) and is the'low definition TV group' of that body now. Nothing has changed really, except the title, and they get a great deal of financial help heretofore not available. The Dutch NBTV handbook will be published by Veron in future.

Doug Pitt
Chairman, N.B.T.V.A.

Dear ED,

I have been doing some research into co-channel interference problems on UHF.

One solution, would be for people who would like an alternative to repeaters to equip their receivers with a tone filter. The frequency I have seen used is 875Hz.

The rig remains deaf when tuning over repeaters or auto-scanning through broadcast stations but 'bursts into life' when on 435 MHz, or any other frequency where stations are using the 'mute tone'.

Geoff Douglas-smith
EX G6AGE/T

24cm AMATEUR TELEVISION.

There is a growing interest in amateur TV in the 24cm band, however many members have little or no information on the equipment needed for this band.

I intend soon to devote a large part of one issue to this subject so if anyone has any information and articles which I could use would they please let me have them as soon as possible.

ED.

A5 MAGAZINE CHANGES HANDS.

Did you hear the news? Henry Ruh, KB9FC has sold A5 magazine to Mike Stone, WBØQCD.

The 14 year tradition will continue, reporting what's hapening in amateur television (both FSTV and SSTV), with new emphasis on expanding coverage to other amateur specialized communication modes such as MSTV, RTTY, ASCII, MTTY, FAX, SAT, EME etc.

All correspondence for this magazine should in future be sent to; Mike Stone, A5 magazine, PO box H, Lowden, Iowa 52255, U.S.A.

SLOW-SCAN TELEVISION.

The reason that there is little information on SSTV in the magazine of late is simply that no one has sent any copy to me at all. I would very much like to see more SSTV articles so if anyone has anything to contribute please send it along.

ED.

TREASURY MATTERS.

Our Treasurer will be moving house towards the end of the year therefore all subscriptions and other correspondence for the Treasurer should for the time being be addressed to either "BATC subs" or "the Treasurer" c/o Mr. M.T.Crampton, 16 Percival Road, Rugby, Warwickshire.

Difficulty is being experienced in finding someone to audit the club's accounts. If anyone with experience in accountancy would be prepared to offer assistance Arthur Rix would be very pleased to hear from them.

I regret that lack of space again forces me to relinquish my soap box and therefore I am unable to inflict upon you my usual waffle under the banner of an editorial.

ED.

BOOK REVIEW

VIDEO HANDBOOK by Ruw van Wezel, edited by Gordon J.King.
Newnes Technical Books, £19.90p

This new book is the first really practical volume dealing with the technical side of video from the intelligent amateur's viewpoint. For the ATVer it is full of "real" circuits ranging from simple building blocks to complete monitors, processing amplifiers and effects generators. Circuits and descriptions are given for an aperture corrector, a crispener as well as a build-it-yourself monochrome camera. All you wanted to know on camera tubes and optics are here as well as video and broadcasting theory, all from a practical viewpoint.

This is an enthusiast's book, not just a textbook and, although the price is high, you would have to buy several other books to collect together so much information. It represents very good value for money and should be looked out for in your bookshop or library.

Andy Emmerson, G8PTH

ATV FILTER for the 70cm band

ARTICLE by Oskar Belser, DL4FA TRANSLATION by G8PTH

It is with pleasure that we present the first article from "Der TV-Amateur" and we look forward to further interchange of articles and ideas in the future.

1. GENERAL

Owing to the broadbandedness of the signal and the sound (and often colour) sub-carriers also required, the problems involved with amateur televison are far greater than with other modes. The main problem is the fact that at any, or indeed many a point in the signal path the sound and picture carriers can mix. This occurs not only in the UHF mixer but also in the subsequent RF amplifier stages. The result is a series of unwanted picture-sound sub carriers.

Since all the frequencies contained in the video signal behave in the same way these subcarriers carry over a wide frequency spectrum. This interference spectrum influences radio traffic not only within the amateur band but also the commercial services either side and must therefore be suppressed effectively. The following possibliites present themselves:

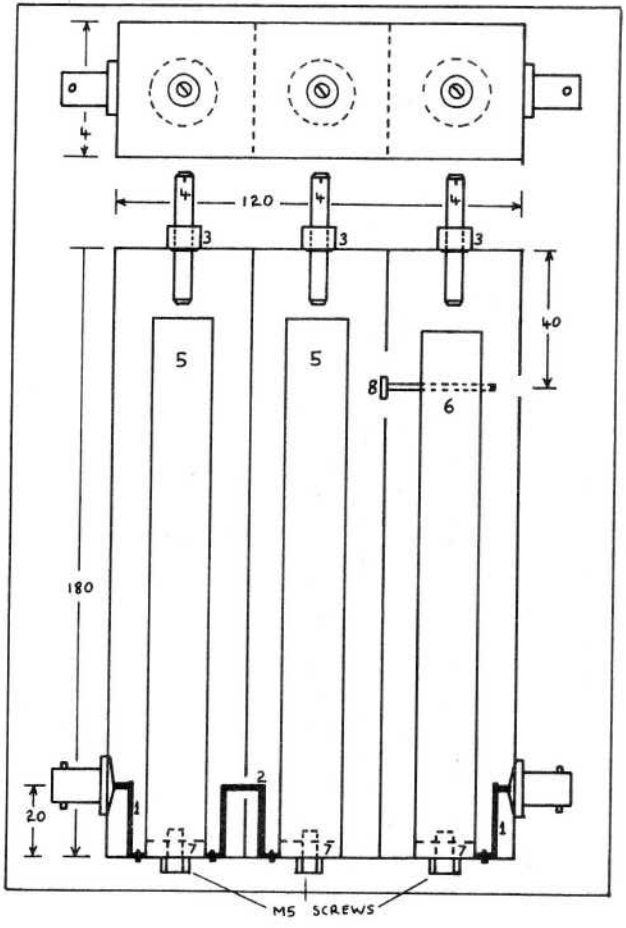
a) you prevent its occurrence by building an ultra-linear mixer and RF amplifier. The amount of testgear necessary for this operation is scarcely within the means of the amateur. Further, the output gained from such ultra-linear amplifiers in no way reflects the amount of effort input.
b) you suppress the unwanted products by specially designed filters. It goes without saying that such a filter imposes certain demands.

It must be mentioned in addition that other techniques - e.g. separate video and audio transmitters - bring no solution to the problem, only a partial improvement. Certainly the video/audio sub carriers are suppressed better in this method, but the intereference spectrum caused by video-only components goes out unhindered.

2. REQUIREMENTS OF THE FILTER

Research with various ATV transmitters (output 0.5 to 25W peak sync power) showed that the first sub carriers (VF - 5.5MHz, AF + 5.5MHz) lie at around 35 dB below the level of the video carrier if the transmitter is carefully adjusted and driven reasonably. *(Translator's note: since this article refers to Continental practice the audio frequency AF lies 5.5, not 6.0, MHz above the video frequency VF. The expression sub carrier is used here to denote an unwanted subsidiary product.)* To increase the suppression of the interference to 60 dB a filter will have to achieve 15 dB attenuation. At first sight this does not seem to big a problem. However, if one takes into consideration that the bandwidth of the filter must cover 6 MHz and that the interference frequencies are just 5 MHz away from the flanks of the filter passband the matter takes on some difficulty. Looking generously at the through attenuation of such a filter one could tolerate 2 to 3dB, though the flatness of the pass-curve must be within 1dB to be sure of passing colour satisfactorily.

My efforts to bring all these requirements together were none too successful, due to dissatisfactory test results and the dimensions of the trial constructions, which were taking on the size of a medium-sized travel suitcase. After a fairly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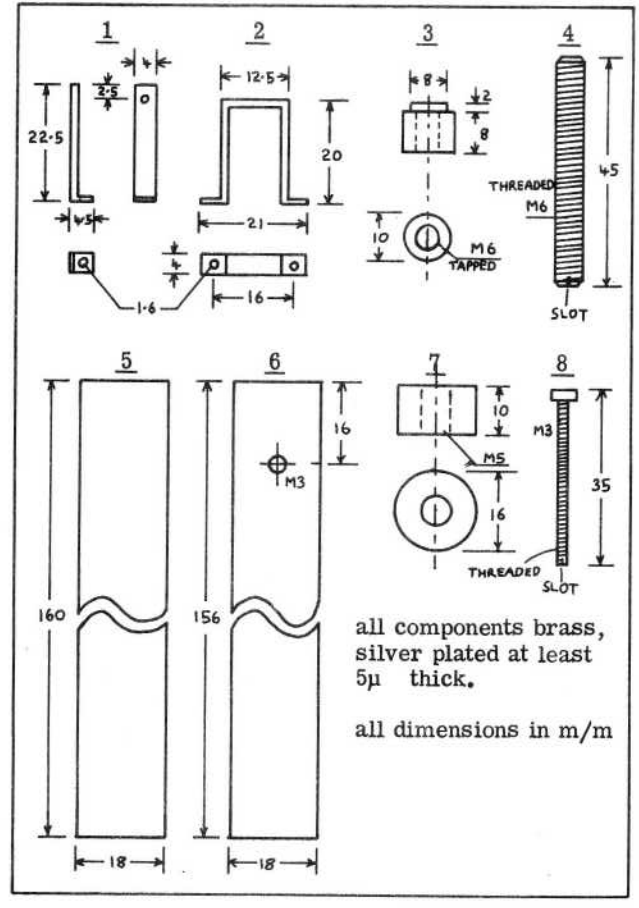
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M3
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THREADED
SLOT
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18
all components brass, silver plated at least 5μ thick.
all dimensions in m/m

long pause for thought I finally reached the desired outcome which I will now describe.

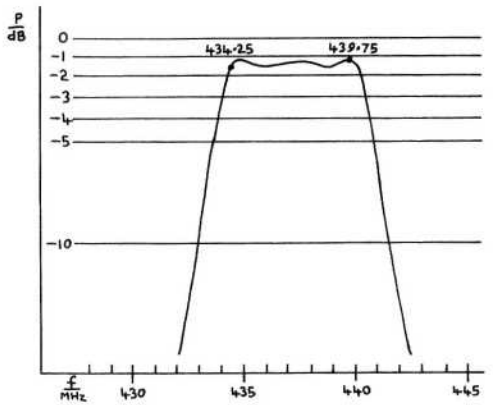
It is a three-pole tubular filter. The resonators are approaching quarter λ long and are brought to resonance with the adjuster screws (4). Both input and output coupling (1) as well as coupling between the two circuits (2) is achieved inductively in order to maintain the bandwidth. In addition, variable capacitive coupling (8) is provided in order to allow the shape of the pass-curve and the bandwidth to be "fine tuned". With the latter the bandwidth can be varied by about ± 0.5 MHz. The most important dimensions are shown on drawings 4 and 5. A sample of this filter has been built commercially. All components are brass, electro-plated to a depth of 5 to 10 µm with silver. The test results are indicated in figures 6 and 7.

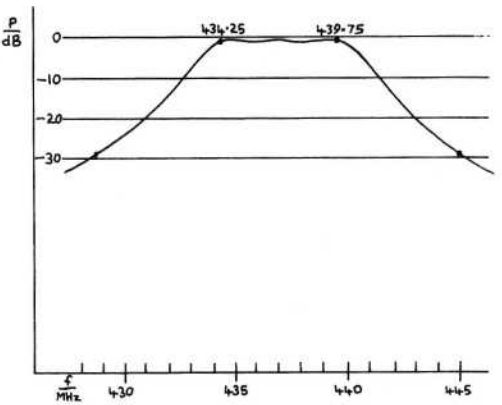
Anyone who is handy and perhaps has a lathe at his disposal can certainly make a simple replica of this filter using the following instructions.
For the housing double-sided copper-clad epoxy printed circuit board is suitable. Once all drilling is complete all the parts, with the exception of the cover plate, can be soldered together, leaving no "seams". For the resonator tubes (5 and 6) copper tubing with an external diamter of 18 mm can be used. *(The German article says you can find this in plumbing shops - perhaps someone can confirm this is the case here as well - G8PTH.)* At their lower ends they must be provided with a threaded socket (7) made of brass for fastening. These are forced into the ends of the tubes and soldered in. Adjustment screws (4) and guides (3) are also made of brass. After fitting in the housing these guides must be soldered on both sides. The coupling studs need not necessarily be of brass, a normal M3 screw cut to length and provided with a slot would do. The coupling loops (1 and 2) are cut out of copper foil and screwed or sweated to the housing.

Since the innards of the filter ought to remain accessible for any future adjustments the cover plate or lid should be screwed on. To this end you should fix small tinplate strips or angles on the inner edges and dividing walls. If the corresponding holes have been drilled the lid can be screwed on with self-tapping screws (2.9 x 6.5 mm). It is important to keep them no more than 40 mm apart.

For setting up the filter the best apparatus is either a wobbulator or a spectrum analyser, but since the amateur seldom has such expensive instruments available another method must be found ...
Connect the ATV transmitter to a dummy load-wattmeter, modulate for best picture quality (observe detected output on scope or monitor), using an audio signal adjust output circuit of the transmitter's final stage for maximum output *(remember: this filter is for combined sound and vision transmitters primarily)*, connect filter between transmitter and dummy load, screw in adjustment screws of the tube circuit (5) so that they project about 5 mm into the tube, ditto the screw of circuit 6 but only 3 mm, turn the coupling stud (8) as far as the dividing wall so that it closes flush, switch on ATV transmitter and adjust all three screws alternately for maximum output.

With correct adjustment the wattmeter should indicate an output of at least 70 to 75% of that which was measured without the filter in circuit. Using this method you do not reach the optimal adjstment admittedly, but you will not be far off. The two photographs of the spectrum show the effectiveness of the filter very clearly. Figure 1 was taken without the filter, in fig. 2 it was connected. The transmitter was modulated with 0.5 MHz needle pulses; the divisions on the graticule are 2 MHz and 10 dB respectively. The compiler hopes people have success with their copies and that in this way ATVers can enjoy their hobby without any worries. If there is sufficient interest he is also prepared to have these filters made professionally from brass and silver. Fully adjusted and complete they would cost DM 360 *(about £90)* or DM 325 *(about £80)* to AGAF members (provisional prices). *(Any UK enquiries to G8PTH - I am a member of AGAF. Write to me, Andrew Emmerson, at 4 Mount pleasant, Blean Common, Canterbury, Kent, CT2 9EU.)* E & OE.





Insertion loss.....1.2dB
Passband ripple.....0.3dB
Maximum input power..... 250W

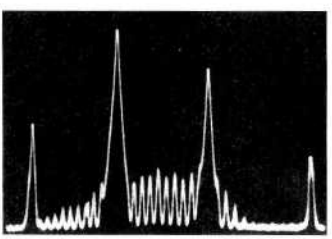


Fig.1 output spectrum without filter.

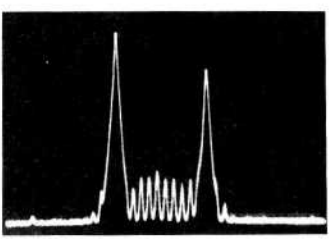


Fig.2 Output spectrum with filter.

ATV CALLING/TALKBACK FREQUENCIES:

144.75 MHz (mainly FM but can be used for all modes).

144.17 MHz (single sideband only).

(Please QSY from these frequencies after contact has been established).

TELEVISION BROADCASTING – A personal reflection

by Roger F. Appleton C.Eng. MIERE, FRTS
Director of engineering - London Weekend TV.
President of the British Amateur Television Club.

I can trace my interest in 'electronics' back to 1949 and the days of military surplus equipment which was abundantly available at the time. I was still a pupil at Abingdon school where I always had a leaning towards the science subjects and remember buying a surplus radar unit to modify into a superhet MW/LW receiver as described in Practical Wireless.

The family moved to Abingdon from Isleworth in West London in 1948, where my father took a position in the Technical Specifications section at AERE Harwell. I also joined AERE as a Scientific Assistant after leaving school and studied for HNC in Physics at Oxford School of Technology.

The scientific and technical nature of the work at Harwell helped develop an intense interest in radio, television and audio (I would not use the term High-Fi for the equipment constructed at that time!) for those who can remember, I built an audio amplifier using a 6J5 as the output stage - replacing it with a 6V6 and the appropriate output transformer was a major step forward! Remember also replaceable steel and thorn pick-up needles, Baxandall tone control circuits, 400 volts HT and push-pull 807's without negative feedback giving 50 Watts of power output? (but at what distortion!) Word got round in a (then) small community like Abingdon and the gear was pressed into use to provide music for the Old Tyme Dancing Club and local Church hall "do's". I also made a 'Wireless World' television receiver using EF50s and 'brute force' EHT, which served the family well.

It was my father who set me on the road to a career in broadcasting. He pointed out an advertisement in an evening paper inviting applicants for Technical Assistants at the BBC in London.

I decided that the future lay in television and not radio, and remember stressing at the interview my involvement with pulse techniques at AERE. By some miracle, the offer was made to join BBC television at Lime Grove and on September 24th 1954 I packed my belongings and moved to London to live with my grandmother at Hounslow.

I shall never forget or regret the two and a half years spent with the BBC in the CAR/Presentation area at Lime Grove. The training was meticulous and thorough, including two courses at the Evesham Training School, and friends made in the BBC then are still friends today.

The only complaint was that it seemed impossible to transfer to a different organisation . I would like to have worked in studios or outside broadcasts, but such requests were frowned upon - not the done thing. It is not surprising therefore, that in 1957, an advertisement for Technical Assistants at Granada's Chelsea Palace studio, a part of the newly established ITV network, proved attractive. Having just become a married man it took a lot of heart-searching before applying, but I wrote for an interview and was offered a post in the engineering department, with a whole range of (undefined) duties.

There is no doubt that the year spent working in Chelsea was the most agreeable I have ever spent. At one time this studio originated four live television shows every five working days. Remember Chelsea at Nine, The Army Game, Spot the Tune and Under Fire? - all Chelsea, using a de-rigged Pye 3" Image Orthicon scanner. One day would be spent in vision control - another as a boom tracker or operator - another as cameraman. The only way I can describe it is "real up-front show-biz television" - it was marvellous.

Alas, Chelsea Palace was only a temporary measure while Granada were establishing their Manchester base and, in 1958, not wanting to move North, I looked for alternatives.

Associated Rediffusion, the London based ITV company were expanding and my application for a job at Wembley Studios was successful. I remained there until 1971.

The Assistant Head of Engineering at Associated Rediffusion, Basil Bultitude, must have taken a shine to me and decided that this new recruit should spend time in each of the engineering sections; but not before sorting out a very decrepit Pye scanner (which nobody else would touch) using my Granada Pye equipment experience!

So, after a period in outside broadcast maintenance I joined the Telecine section, a very important area not only because a good deal of the company's output was on film, but also the vital commercials were transmitted from this area. After Telecine, it was on to a Master Control shift, eventually becoming a shift leader.

By the end of 1959 experience had also been built up in studio vision control and on outside broadcasts and it was very satisfying to be given the job of supervisory engineer (vision) on the mammoth ITV set-up to cover the wedding of HRH Princess Margaret and Lord Snowdon in 1961. Yes, it did include the famous (or infamous) Pye scanner, taken out of 'moth balls' for the occasion!

An interesting assignment in 1960 was to provide unilaterial broadcasting facilities for ITN at the Vienna summit meeting of President Kennedy and Premier Kruschev. It was interesting in that ITN could not arrange facilities in the normal way and I had to start from scratch, in Vienna, by hiring a room, equipment and lines to London. The key item of equipment was a hired television set with head phones wired in place of the loudspeaker to monitor the local broadcasts.
In this way the commentator - Brian Connell - could listen to and watch events, translating them into English for our own contributions. Even today, whenever I see Brian at an industry function he always mentions "Vienna" and considering my German is about as good as my Chinese, I don't know how it all happened!

I cannot tell you the satisfaction felt from originating 13 hours of unilateral broadcast on the political 'event of the decade' using such limited facilities, particularly as ITN were the first news service in the world to relay the final communiqué live to the waiting public. What a party at the end of that week!

Also in 1960, Associated Rediffusion built a new studio (Studio 5) at Wembley, equipped with the very latest EMI 203 Image Orthicon cameras. I was asked to work the studio up and take charge of the opening show - Arabian nights - which used 8 cameras to cover a massive set with 300 extras, 6 camels, 3 elephants, horses and all sorts. Another all night party!

Once Studio 5 settled down there was a transfer to VTR section at Television House, Kingsway - the other 'end' of the company's operation - to become acquainted with the 'black art' of video tape recording. Some of the first "knife and fork" editing was done here - I remember spending days cutting out commercial breaks from dozens of CBC programmes which the company had bought, using developing fluid to find the frame interval period where the cuts had to be.

After that it was on to Radio Links where, after a suitable initiation period of climbing towers and rigging links on buildings in London, I became Links Planning Engineer - a most enjoyable period.

About 18 months later another transfer, this time to outside broadcasts as Supervisory Engineer-in-Charge. During this period a second mammoth outside broadcast took place which my great friend Basil and I planned together; the funeral of Sir Winston Churchill. Later on, the thunder clouds started to gather as the ITV contracts came up for renewal and Rediffusion (as it had now become) was, unfortunately, unsuccessful in its bid to regain its contract.

So it was that in May 1968 I joined London Weekend Television, but as the new company had taken a lease on the Wembley studio complex, I remained there as Engineer-in-Charge of the Central Technical area.

1968 was the time of change from 405 to 625 lines monochrome working, in readiness for colour transmission in the Autumn of 1969. The company was of course buying colour equipment to install in the technical areas and I was given the job of establishing a training programme to ensure that our engineers and creative staff were ready to meet the challenge, and to set technical standards of operation.

I would like to pay tribute to all those who helped with this; Dr. Boris Townsend of the IBA, Bob Roberts of Northern Polytechnic and Bernie Rogers of Rank who came to Wembley to give lectures on the principles of colour; EMI and Marconi who gave of their technical expertise. Without them we would have failed.

In 1971 I was appointed Chief Engineer at LWT and, with the General Manager, Vic Gardiner, took over the construction of a new television studio complex on the South Bank of the Thames - Kent House. The first studio and MCR went into service in May 1972 and the building was completed in 1973, from where we have broadcast ever since. H.R.H. The Duke of Kent (hence Kent House) performed the opening ceremony and it was my great pleasure to conduct him around the new technical areas in the company of the Board of Directors.

We also operate a studio at Stonebridge Park in North West London, which was equipped for colour in 1973 - our outside broadcast and radio links vehicles are also based there.

In 1975 we constructed a switching/recording centre in London for the British Forces Broadcasting Television Service in Germany. Programmes from the three networks are recorded, on a daily basis, and are flown to Germany to be replayed from a 3 VTR machine mobile unit into a low power UHF transmitter network covering the areas where soldiers and their families live. LWT operates this service for the BFBS, which also meets the highest standards of technical performance.

What else has happened over the last few years? Well, I have been Chairman of the Indipendent Television Companies Association - Technical Committee, (the quarterly meeting of all the ITV company Chief Engineers for three years. Also the industry's representative to the EBU Technical Committee, Chairman of ITCA Research and Development Sub-Committee and Member of Council of the Royal Television Society. I consider an involvement with the industry at large to be very important, especially in a federal system like ITV.

In 1973, I became a Director of Dynamic Technology Ltd., a wholly owned manufacturing subsidary of LWT, which designs and manufactures electronic equipment for television broadcasters. Studio lighting control systems, VDA's, EDA's, SDA's, telecine and VTR machine remote control systems are among the products sold world wide. In 1975, I was involved in the early development of Oracle (ITV's Teletext system) which is originated here at the South Bank.

What's happening now? As you can imagine LWT, like any other television broadcaster, has to keep up with new technology. Also, much of the equipment still in use was purchased for those early colour programmes in 1969, so we have a major re-equipping programme on our hands.

We have already replaced most of our EMI 2001 cameras with Marconi MK IX's. New Grass Valley 300 vision mixers have been installed in our three studios at South Bank, along with a Quantel DPE 5000 special effects unit. New 1" 'C' format VTR's are being purchased, a new OB unit, new radio links vans and so on. In all, the Company expects to spend over £10M on new technical equipment over the period 1980/82.

And the future? We have the 4th Channel to look forward to. LWT is planning a new master control room which will insert commercials into the London transmissions of this programme stream, due 'on-air' in October, 1982.

We are watching carefully developments in satellite broadcasting and cable distribution systems. Video cassette and video disc systems offer enormous scope to a company like LWT which is an originator of programmes. Such is the pace of development of these new systems, the whole structure of broadcasting could change in the present decade. Indeed, our own Chairman, the RT HON John Freeman said at the 1979 Royal Television Society Convention at Cambridge "the next ten years could see the end of the broadcasting institutions as we know them" - a sobering thought.

On the engineering side we face tremendous challenges keeping up with technological development. For example, how do we overcome the problem of purchasing a new piece of equipment which is almost out of date by the time it is installed? And training. How do we keep up with new technology in training terms? Two problems here. One is the need to re-train engineers who were not brought up with computer techniques (and everything has a microprocessor in it these days, even the talkback system!) The other problem is that modern equipment is so reliable that maintenance engineers rarely have the chance to put a 'scope on it - thus, when it does go wrong it's "get out the handbook and start at page one" - not the best way to deal with an instant transmission problem!

What about the production side of television? Well, we all have our views on programmes and after all that is what it is all about in the end. But have production techniques kept up with engineering? I believe they have, although I sometimes regret what I term the 'misuse' of the system. No, I don't think all pictures should be in Mickey Mouse colour, but often I think that programme directors stretch the limits of the system by using too many gauzes, too much de-saturation and low key lighting. This looks fine on the studio monitors in ideal viewing conditions, but I hate to think what it's like in the fringe areas of Wigan on a set crawling with noise! Nevertheless, looking back at early productions we are now able to produce exactly the right mood and atmosphere in a drama, without stepping outside the system limits too much.

I now have a terrible admission to make; I have never been directly involved in amateur television (although my Managing Director might disagree!) but I have friends who are and I am a true Hi-Fi enthusiast and use radio control systems which I think are absolute magic. I suppose I am too near to the business to have thought about it seriously, but I know there is a great following and that the BATC could probably teach us 'professionals' a thing or two, so I shall be on the look-out for new ideas.

What I am looking forward to is my term of office as your President and I intend to meet with as many of you as possible and learn about the Club and its activities.

Finally, if anyone would like to make direct contact with me for information or an opinion on any technical matter concerning television, please do so.
The address is:

London Weekend Television Ltd.,
South Bank Television Centre,
Kent House,
Upper Ground,
London, SE1 9LT

'UOSAT' IS LAUNCHED.

The University of Surrey's amateur satellite UOSAT was successfully launched on October 6th 1981 from the Western Test Range at Vandenberg, California. Full operation (including the TV experiment) is expected in a few weeks, although telemetry data is already being sent back to the command centre.

HANDBOOK NOTES

ELECTRONIC CHARACTER GENERATOR.

Some people are having trouble with badly formed or streaky characters. The problem is with the input to TR5 on the analogue diagram (Fig.7). There are several mod's to this stage developed by divers persons, which are listed as follows;

Fit a 1000pF capacitor across the 1K base resistor.
Fit a 3300pF capacitor across the 4.7K base resistor.
Change the 1K resistor to 100 ohms.
Change the 4.7K resistor to about 390 ohms.

It is recommended that these mod's be tried out one (or two) at a time until a cure is affected.

COLOUR SUB-CARRIER OSCILLATOR.

The oscillator sometimes has a poor output waveform. The trouble is in the oscillator circuit itself (TR1) which could benefit from a different circuit. An improvement can be affected by removing the 33K base resistor.

R.F. PROBE.

When setting-up the RF probe on page 31 it is essential that the circuit is not over driven. The correct way to set it up is to monitor the output on a 'scope then adjust the transmitter for normal operation. Adjust the probe penetration to obtain about 1v p-p across 75 ohms when viewed on the 'scope. Over driving will produce a signal which is distorted both in its picture content and in its syncs.

ELECTRONIC TEST CARD.

A circuit is available to electronically generate your callsign and inlay it into the oblong box at the bottom of the circle. The circuit will be published in a future issue but anyone who can't wait should send a large SAE to the Editor, G3YQC.

No problems have been reported with the test card except where an IC pin or two have not been soldered to both sides of the board.

Some patterning will be experienced with the finer frequency gratings when used in conjunction with the Handbook PAL coder. This is because the frequency of the multiburst is in the vicinity of the colour sub-carrier oscillator frequency.

If the 40 MHz oscillator on board one either fails to operate or goes off at the wrong frequency (usually producing a double image on the screen) try a small value capacitor (up to about 30pF) from IC1 pin 2 (schmitt input) to ground. Use SHORT leads.

T.V. ON THE AIR

COMPILED BY ANDREW EMMERSON G8PTH

What a lot I got! If the rate at which I am receiving reports for this column is anything to go by, the ATV hobby must be having a bumper year in 1981. By the time you read this our ATV exhibition *will have been and gone, and I dare say someone will confirm that 1981 has been a good year for recruitment to the BATC. More and more people are realising there's more to amateur radio than nattering on repeaters and with the growth of home video it's only natural that more people are turning to ATV.*
But the good folk who took the trouble to write in with their news already know that, so let's not waste any more time. On this occasion I'm throwing the usual attempts at style to the winds, so ignore the grammar or lack thereof, I'm just going to cram it in ...

We start on the eastern side of the country, in Bury St. Edmunds. Peter Chapman G8VBS says he is now on the air with 10 watts. Uses a Wood and Douglas exciter strip feeding a PC Electronics PA5 amplifier, callsign in "big letters" from an Acorn Atom computer (albeit 60 hz!) and a small zoom lens camera. QTH is very low down so portable operation is used as well. Rx is MM converter (good). Southwards to Chelmsford with G4BCH just on the air with 10W and already working QNs (well, with a lift but that's the way to start!).
To South Croydon now where Martin G4FKK is "playing with ATV" having bought a Fortop converter at the Brighton rally. Antenna is the usual 48 el. multibeam, tx is a modified commercial radio phone (4W) modulated by the famous G8LES circuit. The camera is an unpronouncable Japanese CCTV type. Martin says results have been very encouraging so far and it's a pleasure to work stations who are prepared to help out by answering "silly" questions. G8LES, MNY and ZWM all get bouquets! So do I but I'm too modest to mention it.
Sussex must be THE growth area of the decade with over a dozen stations just on the air or about to be. Ron Bray G8VEH in Shoreham is one. He uses a Wood and Douglas exciter, Motorola MHW-710 PA module and an Akai colour camera. On August 13th Ron made a 135 mile two-way contact with GJ8KNV on the Isle of Jersey. Pix wer P4 and G6AIW and G8XEU also took part. Next day XEU made it again but P1, under flat conditions. Not bad!! In preparation for the forthcoming ATV contest G8VEH, XEU, WXS and G6AIW established a portable station on Chanctonbury Ring, 720 feet ASL above Worthing. Five two-way contacts were made, including Jack G8ZWM in Crawley.
Nearby in Durrington lives Roy G6AIW. He uses the G4DYP exciter (and is very pleased with it) to drive a Motorola MHW-710, with thoughts of a 30W PA using a BLW 82 device. Rx employs the Mickey Mouse converter.Other stations in the district include Robin G8XEU, perched almost atop the South Downs (much to Roy's envy!). Tx is PC Electronics with a MM upconverter for rx. Martin G8KOE in East Preston has all homebrew gear, the tx being capable of 60W. In Lancing Tony G8XRX is still working on his tx (Pye pocketfone strip) and a homebrew rx. Also working on transmitters are Nick G4JEI and John G8JXC. On the receiving side they have a lot of viewers, not all amateurs, and several now have the bug to start transmitting. Among these are Ray G8CUH, Vic G8MVQ, Jim G4MDP and Charles G4GUO. Back on TV is Jeff G8DHE who used to be a G6---/T; his interest having been reactivated by the level of new activity, most of which is since April. Almost forgotten is G3UEQ in Chichester who apparently runs inter-carrier sound.
Further north is another hotbed of ATV activity centred on Crawley. Here Jack G8ZWM and G3GRO do the transmitting while G3NRC, G3SYD and G8YMP build transmitters feverishly. In Reigate G8RXM is on the air and G3CTY (Epsom) and G3IRP (Carshalton) hope to be soon. Activity in Crawley is nightly at nine o' clock - I know hams do

it with more frequency but this is getting excessive! Idiot boy has just taken the next letter out of its envelope and finds it's another one from Crawley! This one identifies G3GRO as Derek and G8RXM as John. It also mentions Peter G4FYY, who is also transmitting in Crawley. Jack G8ZWM wrote the letter and says he is having a lot of fun with all this activity - "simple monochrome stuff but lots of knob twiddling!" Polarisation in this neck of the woods is vertical, with talkback on S14. How strange - I guess someone is rockbound. Jack's setup is G4DYP exciter and MHW-710 PA.(I bet Johnny Birkett wishes he had had three times the quantity of those 710s - now they have gone you can still get them from your scribe but at normal shop price. I bet John G4DYP wishes he was getting royalties too!) Back to the ranch in Crawley - other stations building transmitters are G8WWD,G3NPV, while viewers include G3SBJ, G3MSK, two SWLs and a couple of "good buddies". Jack has also tried some portable expeditions with success, including the Chalk Pits museum.

Some time back I mentioned that the radio club at Martlesham Heath (site of microwave beacon and Buzby's research station) were intending to build a TV station. I hear this is right and John G8NOW is building the tx.

W.Moore is G8DTT and he lives in Crewe. He is busily setting himself up for tv. Preamp and converter are already built and a Nascom 2 micro-computer is available for captions and test patterns. Camera is the Practical Electronics design and G8DTT says he is not completely satisfied with its performance - sounds all the same as if he has got it to function which is more than most people who tried this design did!! Anyway, he is going design his own now. The tx sounds novel as he is using the LM1889 i.c. which after VSB filtering will be mixed with a 400 MHz RF source. He is hoping to recruit a few more members locally so that can't be bad. Finally, across to the east where Trevor G8CJS has been out mobile on hilltops, sending very good pictures to Brian G8GQS in Gainsborough. Brian has also received fine pix from G8PRG, a new station in Doncaster who is looking for contacts. Active transmitting stations in the Chesterfield - Bolsover - Sheffield locality include G8VQS, G4EKD, G4AGE, G3WTY, G4DYB, G8IHP. There are now so many stations on the air in some districts that it is no longer possible to produce proper geographical maps for inclusion in this column. I am, however, still marking all stations on a wall map which I take round to rallies and exhibitions.

I think most people will agree we have had a good summer this year, albeit a late one. As I write (5th September) we have had three days of superb weather with conditions sufficiently lively at night to permit ATV contacts with ONs and an expatriate English ATVer, Esmond F6GOV in Lille.Also Laurent F1BJB has come up with a superb three hour tape of ATV activity in France and anyone wanting a copy on VHS has only to send me a tape and return postage. I regret I cannot manage other formats.

Please keep sending your letters to the column, it saves me the bore of inventing it all myself! Write to me at

4 Mount Pleasant, Blean Common, CANTERBURY, Kent, CT2 9EU.

STOP PRESS!!

Conditions after I typed this were excellent. Sunday 6th September was "wide open" from early morning until about 11. G4IMO and yours truly exchanged P5 pictures with Marc ON5VW and Dick ON4ABC. Marc was 40 km west of Brussels and Dick in Kortrijk. Meanwhile G8UWS (John, Folkestone) was working another ON. During the evening conditions were slightly weaker, but F2XO (Jean, Boulogne) sent some very nice colour pictures of his shack and young grandson in SECAM, positive modulation. Over in Essex Nick G4IMO had a PAL colour camera trained on the receiver and was recording the proceedings. Afterwards he transmitted the pictures back to Jean in glorious PAL colour! Well, you must admit it's different!!

review

FORTOP TVT432 ATV TRANSMITTER

John L. Wood. G3YQC

INTRODUCTION

Fortop Ltd. (formerly R. F. Consultants Ltd.) are a new company specialising in the manufacture of RF equipment for the amateur television market.

One of their first products is the TVT432 70cm ATV transmitter. This unit is compact and self-contained needing only a power supply, a video source and an aerial to provide a very effective high quality television transmitter.

SPECIFICATION

VIDEO INPUT	1v p-p into 75 ohms
CARRIER FREQUENCY	435 MHz fitted (or to order)
POWER OUTPUT	15W peak sync
POWER REQUIREMENTS	13.5v @ 3.5A peak
SIZE	190mm x 120mm x 55mm
WEIGHT	900 Grams

DESCRIPTION

The transmitter is housed in a black diecast box. It requires a DC supply between 12 and 13.8v at around 3Amps. The RF output connector is BNC and the video input socket is type SO239 (UHF). The power supply connector is a 5 pin lockable DIN type. All connectors are at the rear.

The front panel includes a toggle switch to select one of three transmit frequencies, a 'video gain' control which, together with a 'black level' control, permits the correct adjustment of video/sync ratio, and a transmit toggle switch.

The exciter and modulator are contained on a single high quality glass-fibre double-sided printed circuit board. The layout is logical and construction is neat and well engineered. The driver and PA transistors are housed in a seperate diecast box fitted within the main enclosure providing double screening to prevent RF leakage. These two stages are mounted on a second glass-fibre PCB.

Thermal protection is provided on both power transistors and a sensing diode is wired across each device in order to control the circuitry.

High quality, full-specification components have been used throughout and it is obvious that corners have not been cut by employing second-rate parts. An example is the use of good quality ceramic based pre-set potentiometers on the circuit boards where the usual 'skeleton' types could have been used. A block diagram of the complete transmitter is shown in Fig.1.

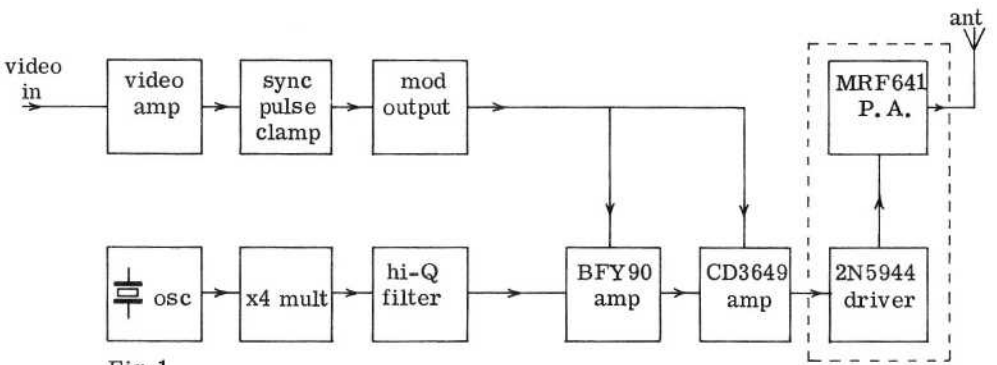


Fig.1

EVALUATION & MEASUREMENTS

The unit was loaned by the manufacturers for this evaluation but is a normal production model taken at random from stock.

Two types of tests were carried out;
a) laboratory measurements using specialised instruments.
b) objective tests to assess the units' performance in normal amateur service.

The transmitter parameters examined were spectral purity of the carrier signal including feedthrough from the oscillator chain, and power output levels over the specified operating voltage range.

The tests were carried out using a Hewlett Packard 8554L spectrum analyzer, a Bird 'thruline' power meter and a Rhode & Schwartz 50ohm resistive power load.

SPECTRUM ANALYSIS

The 435.0 MHz carrier output was clean and free from spurious responses except one which occured 1.42MHz LF of the carrier, this signal however was down at -70dBc (with respect to the carrier).

The outputs from the oscillator/multiplier chain were as follows;

crystal frequency	-62dBc
second harmonic	-64dBc
third harmonic	-60dBc
fifth harmonic	-62dBc

Owing to the short amount available it was not possible to photograph the spectrum display but the drawing in Fig.2. illustrates the results.

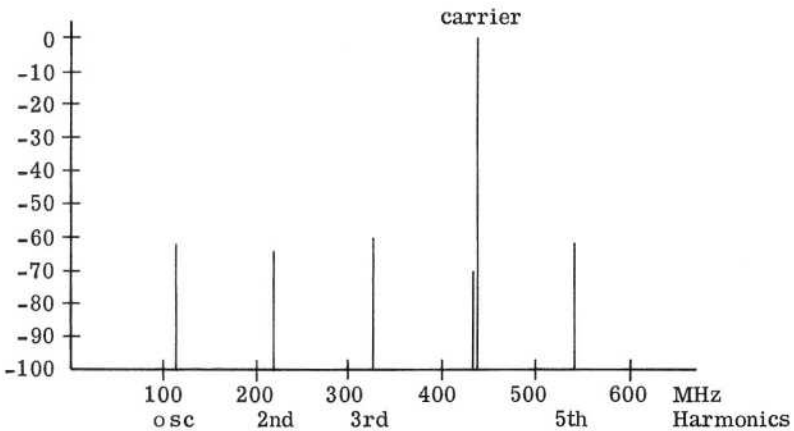


Fig.2

Output power measurements were taken one minute after switch-on and without modulation being applied. The following table shows the output powers measured at the given supply voltages;

SUPPLY VOLTAGE	OUTPUT POWER
12v	12.1W
12.5v	13W
13.5v	15.1W
13.8v	16.2W

To establish the cooling efficiency of the unit the transmitter was left on for a 30 minute period at full carrier power (ie without modulation) and with a 13.5v DC supply.

At the end of this period the power had fallen to 14 Watts and the whole transmitter had become quite warm, although not excessively so. The hottest part was around the RF output socket and the connector itself was particularly hot-the hand could not be left on the socket for more than a few seconds. The cause of this is probably because the PA compartment is fixed to the rear panel by the BNC socket itself, thus encouraging maximum heat transfer. The test was carried out in an ambient temperature of 72°F. The temperature rise was not sufficient to operate the temperature control circuitry.

MEASUREMENT ERRORS

The power meter used in the above tests was calibrated to better than ±5% of the reading. As a further check a Hewlett Packard precision microwave power meter and sensor, together with a laboratory standard attenuator, were also used to confirm the measurements.

OBJECTIVE TESTS

The transmitter was tried out on the air from the station of G3YQC.

An electronically generated colour test-card was used as the video source and, over a 35 mile path, a report of P5 was obtained with full colour received. The finest definition bars (multiburst) which could be resolved were around 4.5MHz. (this was also the case with the same pattern when displayed via a closed circuit colour receiver).

An oscilloscope was used to examine the received waveform and the resultant signal showed no visible limiting of video, sync pulses or colour burst. Full modulation depth was obtained. No distortion of the picture could be detected off the screen and the signal was successfully recorded onto video tape.

A monochrome camera was also tried and the results were described as 'superb'. The test transmission lasted 30 minutes during which no difference in signal strength or picture quality could be detected.

NOTES

After unpacking and inspection, the transmitter was tried out on the air. A very low output power was obtained and the picture was distorted. After about five minutes the power suddenly increased to full output with good quality pictures. Investigation revealed that the stator connection of a trimmer capacitor in the base circuit of the pre-driver stage, although soldered to the underside of the PC board and the top and bottom printed pads were connected together by double soldering of another component, this trimmer, when rotated, appeared to be intermittent causing the output to fluctuate sharply. Soldering the stator lug to the top track completely cured the fault and no further trouble was experienced.

The operation notes accompanying the transmitter were temporary until the printed versions are available.

The installation and operating instructions were quite clear and comprehensive, however the connections to the power plug were not adequately shown. A sketch of the 5pin DIN connector was given showing the supply lead connections but the diagram did not make it clear whether it showed the front or rear views of the connector. It was possible therefore to connect the +12volt line to a spare pin. Since the pins are numbered on the plug itself, I feel that they should be duplicated on the drawing. The only way to be sure of the correct connection first time was to remove the lid to gain access to the rear of the socket. Since the 0volt lead is connected to the centre pin it should not be possible to cause damage by reversing the leads.

The transmit switch is a changeover type and this, used in conjunction with spare pins on the power socket may be wired to provide control power for an aerial changeover relay if required.

The transmitter is supplied with one crystal fitted, producing an output frequency of 435.0 MHz.

I liked.....

a. The smart appearance of the transmitter.
b. The excellent up-to-date design and construction techniques used throughout.
c. The provision of a 'black level' control enabling a non-standard input signal to be corrected and also correction of any non-linearity through the system.
d. The useful level of output power obtained.
e. Provision for three transmit frequencies.
f. The use of good quality components.
g. Stability-the output is always the same whenever the transmitter is switched on and does not require tweeking.

I did not like.....

a. The two controls ('video level' and 'black level') having such a wide range of adjustment, this made their setting quite critical.
b. The transmit being marked 'power on', this could lead to the transmitter being switched to transmit by someone thinking they are merely applying standby power.
c. There being no labeling of the rear panel sockets. It would be possible for a new operator to mix the video and RF sockets unless he realizes that the UHF style socket (widely used on Japanese equipment for RF) is in fact the video input. This could result in 15 Watts of RF into the camera.
d. There being no front panel indicator light.
e. The crystals are soldered in, therefore, to fit other frequencies the main PC board has to be removed.

CONCLUSIONS

The Fortop TVT432 TV transmitter was found to be an excellent unit which performed adequately throughout all the tests.

The transmitter is built to a high standard and has obviously been well designed. The output was clean, the modulation depth was good and the transmitted pictures were faultless. The transmitter represents a product of excellent quality which can be recommended to anyone requiring a ready-built, neat, compact and reliable means of radiating good quality television pictures under main station or portable conditions.

MANUFACTURERS COMMENTS

1. A front panel light is to be fitted in the near future.
2. Due to the high frequency of the crystals it is not possible to use sockets. The board is not difficult to lift but the manufacturers will fit crystals upon request.
3. The pre-driver fault was an unfortunate error on the particular unit under evaluation.

I should like to thank Roland Hall G8KER for his assistance with the laboratory tests.

SATELLITE SAGA

Much controversy has resulted from the statement 'Fast-scan amateur TV in the relatively confined space of 434 - 440 MHz may in the future find itself in conflict with the satellite allocation, 435 - 438 MHz. In view of this it is recommended that TV should move to the wide open spaces of the higher bands during the coming years'. (Radio Communication, July 1981).

Not unnaturally ATVers see this as a direct attack on their right to continue to operate fast-scan TV on 70cm. Consequently a flood of protesting letters have been received by the RSGB and AMSAT UK.

The BATC committee met to consider the situation and, as a result, Graham Shirville, G3VZV has been liasing with the various organisations on our behalf. The BATC has been assured that there is no intention to remove fast-scan TV from 70cm and that the somewhat ambiguous statement has had too much read into it. The hope is expressed that ATVers and satellite users will co-exist without causing mutual interference.

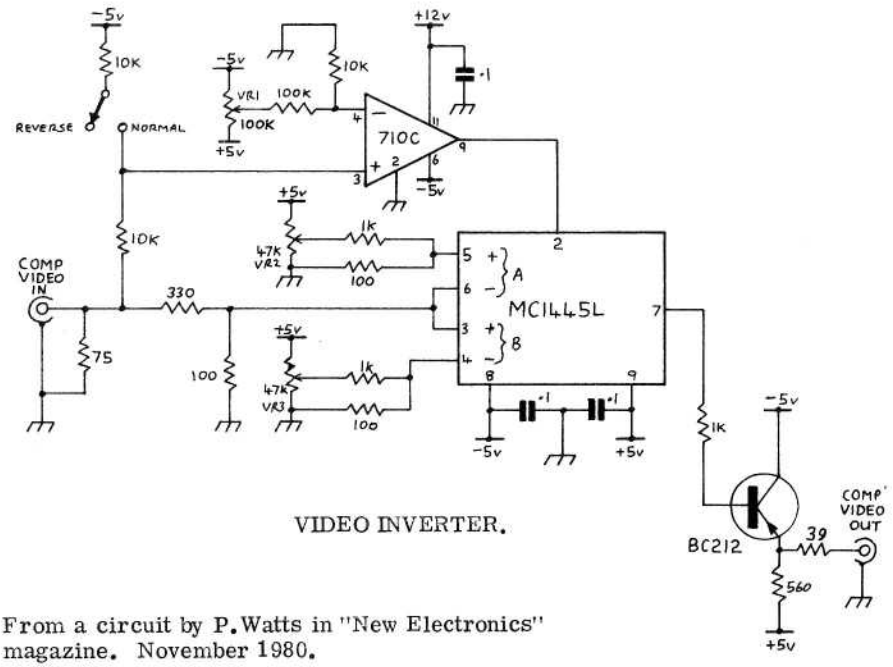
The BATC has recently made contact with officials of AMSAT USA and the AGAF (the German ATV association) and members are assured that the situation is, and will continue to be, closely monitored.

A VIDEO INVERTER

This circuit will invert the video information of a composite TV signal without affecting the syncs.

The circuit uses a Motorola MC1445L wide-band amplifier integrated circuit. This IC has two input channels A and B which are gate-controlled and fed to a common output amplifier.

The video signal is compared with a threshold voltage set by VR1 so that the comparator (710C) output is low during sync pulses and high (if the switch is open) during the video signal. A low on the gate of the MC1445L selects input B which is non-inverting, thus during sync pulses the video signal is unaffected except by VR3 which is used to set the correct DC level on the output. If a logic high is applied to the gate then channel A will be selected and the video information will be inverted. VR2 sets the DC level during this period.



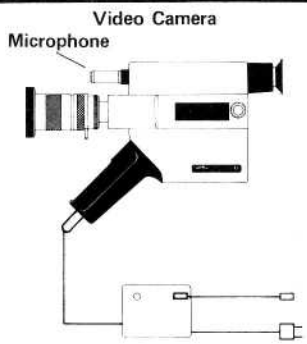
VIDEO INVERTER.

From a circuit by P.Watts in "New Electronics" magazine. November 1980.

SPECIAL OFFERS

The following items are offered at specially reduced prices to members of BATC.

Philips Video Camera V100/15



V100/15 - 625 lines/50 fields
Power supply - 240v 50Hz*
Output - UHF ch.34*
Camera tube - 2/3" hybrid vidicon
Resolution - 500 lines at picture centre (min)
Automatic VA-Control - 1:4000
Lens - f1.8 12.5-50mm zoom, C mount
Viewfinder - 3.75cm electronic
Microphone - built-in omni directional Electret
Camera cable - 10 metres
Mounting - hand held or tripod ($\frac{1}{4}$"whit. bush)

*Can be modified for composite video out and 12volt operation.

SPECIAL OFFER: £110 plus £7 securicor.
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TV – VIDEO – HI-FI

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SCHRADER, remotely tuned UHF masthead pre-amplifier.

Channel range	17 - 68
Gain	20 - 26dB
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CIRCUIT NOTEBOOK

JOHN LAWRENCE, GW3JGA No. 31

In this edition of 'Circuit Notebook' we look at an A - D converter having possible ATV applications. The original text has been abridged slightly and is reprinted from EDN Magazine, January 7th 1981.

Note: This circuit was breadboarded to test its performance. Using a 1volt p-p sine-wave input signal, the maximum frequency at which the circuit would resolve the full ten levels was 200KHz (10 adjacent levels in 2.5uS). Not fast enough for fast-scan TV but for those of you experimenting with SSTV and LDTV it may just solve a problem.

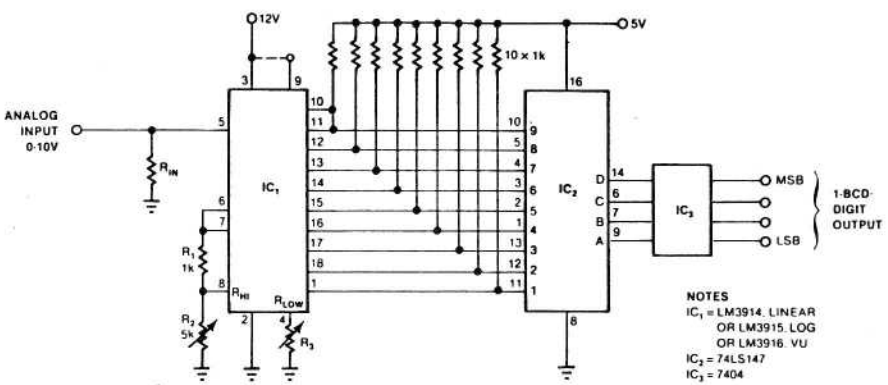
Three ICs form a 4-bit BCD A/D converter

John P Cater
Southwest Research Institute, San Antonio, TX

The A/D converter described here consists of three commonly available integrated circuits. It provides only 10 digitization levels (four bits) but performs like a tracking converter at high speed and with a very simple operation mode.

The key to the design's simplicity is the use of a bar-graph-driver IC (IC_1) to perform the initial analog quantization. An added bonus is the ability to choose a linear, logarithmic or VU-meter type pin-compatible device for this function without making any other circuit changes: You can use an LM3914, LM3915 or LM3916, depending on whether you require a 10-level linear, 30-dB logarithmic, or −20- to +3-dB VU digitization, respectively.

The 10-level bar-graph driver's output provides a "priority" code for the 74LS147 priority encoder (IC_2). Thus, when IC_2 has no inputs, it produces a ZERO. As each sequential output from the bar-graph driver goes LOW, the priority encoder decodes that input to the proper binary output. Then, because the encoder's output (as configured) is a complementary-binary code, four inverters (IC_3) must complement the inverted code to a standard binary format.



You can realize this 10-level BCD-encoded ADC *with only three ICs. Depending on the bar-graph-IC type, the output can be linear, logarithmic or VU related. When you need the maximum conversion rate (without possible glitches), try connecting IC1's pin 9 to the 12V supply.*

One of the really convenient features of this ADC is that it tracks; ie, there are no convert pulses or inaccurate states. Therefore, the four output bits always accurately reflect the analog input signal, eliminating the need for sample/hold circuitry and synchronous timing pulses.

With only four states to work with, the converter does exhibit some disadvantages. However, by using the LM391X's reference-resistor terminals (R_{LOW} and R_{HI}) to set HIGH and LOW thresholds, you can configure the converter to quite accurately monitor a small fluctuation in a relatively large signal.

For example, in a negative-sync video signal referenced to ground, the sync pulse normally goes from the black level (about 0.5V) to ground. The peak white level is normally 1.5V, so a 1V band of video information must be digitized. You can adjust the LM391X for these requirements as follows: Tweak R_2 so that the voltage at R_{HI} is approximately 1.5V, then adjust R_3 so the voltage at R_{LOW} is 0.5V. These adjustments ensure that the 10 discrete digitization levels occur only in the active 1V video-information band.

The circuit's digitization speed is limited by the LM391X's internal input buffer amplifier. Knowledgable sources at National Semiconductor say this amplifier is a typical LM324-type op amp with a slew rate of about 1V/μsec. Thus, the ADC's response time depends on the digitization band: The smaller the band, the more rapidly the converter responds to input changes. For the full-range 10V band, you can expect only audio response, on the order of 20- to 30-μsec conversions. But as the band decreases, the response time for conversion also decreases, reaching the range of 1 μsec or less. **EDN**

3/4W A.T.V. LINEAR

John Hopkins. G4DYP.

CQ-TV 115 gave details of a series of linear amplifiers for ATV transmitters. As with all power transistors at these frequencies they are not cheap, however a small saving can be made on the smallest ($\frac{3}{4}$W) amplifier shown on page 10. In that amplifier a 2N5944 capstan device is used. This was chosen since it is the recommended driver for the 2N5946 in the following stage. However the $\frac{3}{4}$W amplifier could use a cheaper TO-5 can transistor such as the 2N5913, a design for which is shown in Fig.1.

The circuit is very similar to the one in CQ-TV 115 except that different biasing is used. The layout is given in Fig.2 and should be followed as closely as possible. Don't forget that the transistor will need a heat sink.

The figure of $\frac{3}{4}$W is the approximate peak sync output power.

The inductor dimensions shown in Fig.2 are those which gave optimum performance on the author's prototype, other units built may benefit from experimenting with the actual dimensions used.

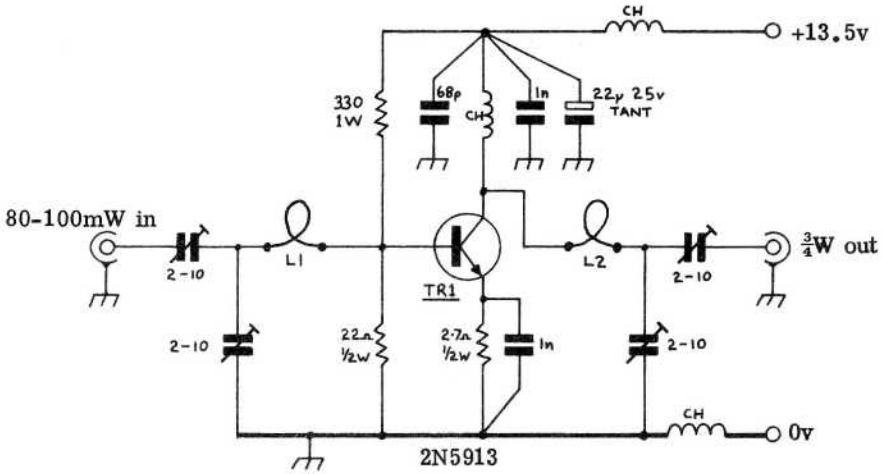
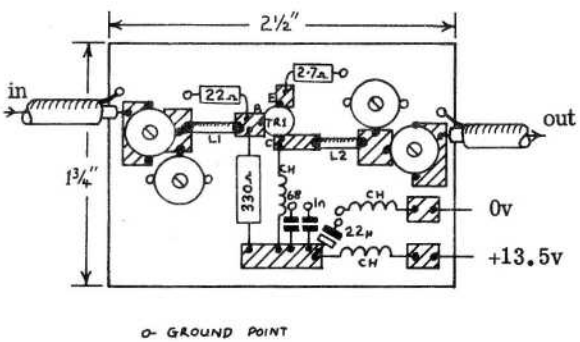


Fig.1 ¾W LINEAR AMPLIFIER



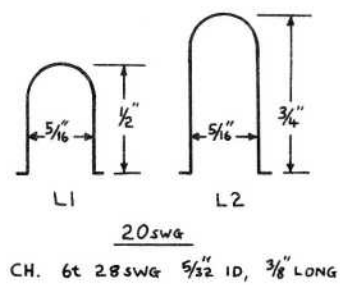
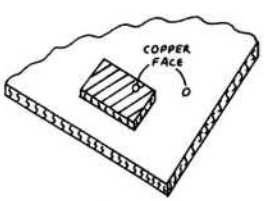


Fig.2 BOARD LAYOUT



Component mounting pads cut from PC board and 'instant' glued to main copper laminate board. Pads are shown as shaded areas,

B.A.T.C. EXHIBITION

Sunday the 4th of October saw the BATC's first ever exhibition which did not combine the bi-annual club convention. BATC committee members had performed the ancient 'sun-rites' during the previous week thus ensuring perfect weather. The sunshine permitted trade stands and visitors to migrate outside easing the congestion within the main exhibition room.

It is estimated that over 500 visitors attended the show, reflecting the tremendous upsurge of interest in ATV especially during the last year. The BATC stand enrolled 35 new members and sold out of almost everything on display.

G4BLL gave an excellent demonstration of SSTV with super quality pictures showing how slow-scan has advanced with the widespread use of digital techniques. His system - based upon the Robot 400 design - 'grabbed' a frame of fast-scan video from a camera and displayed it as SSTV.

PHOTO 1.

The Bristol Group.
L to R: G8GLQ, G8KGH, Jenny and G8FNR. G4BVK was also part of the team.

The Bristol group (1) showed their colour synthesizer and invited visitors to 'twiddle' the knobs to turn any monochrome picture into a full colour one with very interesting results.

Next door was a display by John Lawrence GW3JGA and David GW8PBX demonstrating their 'Golf Whiskey colour fiddle box', this will be featured in a future 'Circuit Notebook'. Live colour pictures were also being received from G(W)3FDE/M in the car park.

PHOTO 2.

The "Golf Whiskey colour fiddle box".
L to R: GW8TKW, GW3FDZ, GW3PBX, GW4LPU and GW3JGA.

PHOTO 3.

The Leicester group.
L to R: G8OBP, G8ZWT, and G4MQS. G3XKX was also present at the exhibition but since he took the photo he was unable to be in it!

The Leicester group had a nice display of TV equipment demonstrating both off-air and closed-circuit ATV. Apart from those in photo 3, G3XKX was also present.

Fortop Ltd., had a selection of their ATV products on display and demonstration. Picture 4 shows the two Steves with some of their test equipment. Interest in this stand was keen and sales and orders were good.

PHOTO 4.

The Fortop Ltd display of amateur television equipment, seen here with some demonstration test gear.

Trevor Brown G8CJS had a rack system of projects from the new 'Handbook'. He also displayed some video tapes of Australian and British amateur TV activities including a new tape just received from Australia. A copy of which will be available shortly.

The Narrow Band Television Association had an excellent working display which created a good deal of interest. Pictures were transmitted at 12½ frames per second and the video bandwidth was a mere 7KHz. The most striking feature was that, unlike SSTV, moving pictures were displayed.

PHOTO 5.

The N.B.T.V. stand with
L to R: Doug Pitt (Chairman), Zoe Pitt (I think!) and S. Kujawinski (Treasurer).

PHOTO 6.
Some of the BATC committee members in front of their stand. L to R: Ian Pawson (publications) Mike Crampton (Chairman), John Wood (Editor CQ-TV), Paul Surtees (above), Arthur Rix (Treasurer) and Peter Delaney (Club Sales).

An ante-room was used to show video tapes of Dud Charman's aerial circus which was well attended throughout the day.

Photo 6 shows some of the BATC committee in front of the club's stand.

Nigel Walker, G8AYC demonstrated his home-built 6800 microcomputer on which he had implemented 'BATCFAX', this used the commercial Teletext standards and was most impressive in full colour. Pages were stored on 5" floppy discs.

PHOTO 7.
Inside Brian Summers' outside broadcast van showing interested observers of a production rehersal.

Other personalities seen around the show included the BATC President Roger Appleton, G5KS from the Midlands Video Group, Keith Hamer and Garry Smith who have published two books on worldwide TV test cards, G8LES from the newly formed Home Counties ATV group and Andrew Emmerson who writes the TV on the Air column.

The BATC expresses its thanks to everyone who helped make the exhibition such a success. Especially Brian Summers and Trevor Brown who organised the event, and Derek Wills G3XKX who took the photographs.

PHOTO 8.
General view of the free trade area including the OB van.

AN R.F. PROBE

By Heinz Venhaus, DC6MR.

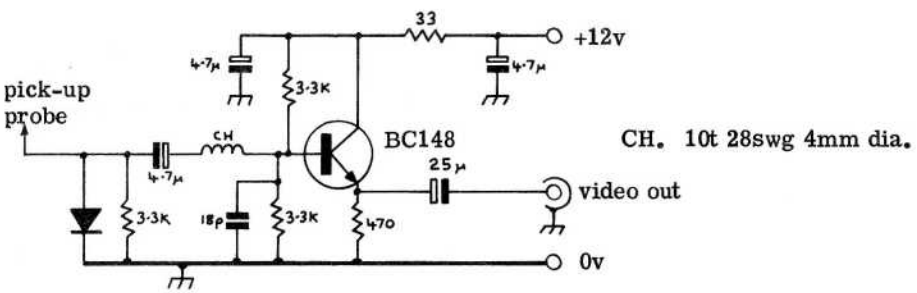
It is essential to be able to correctly monitor your output signal when transmitting television. It is not sufficient to use a local receiver which relies on stray RF pickup in the shack. Such a system will almost certainly produce distortions of the received signal and you will never be sure that your transmitted picture is as it should be.

The answer of course is to use a small demodulator which can pick off a 'sniff' of RF from the aerial coax and convert it into a video signal suitable for driving a monitor and/or oscilloscope.

The circuit shown here is probably the simplest form of RF probe available for this job. It consists of a detector diode at the pick-up lead followed by an emitter follower which produces around 1.5v p-p of video into a 75ohm load.

The circuit should be built on a small PC or Vero board and should be installed close to the transmitter output socket. A short piece of hookup wire is used as the probe and should be positioned only as close to the output coax as is necessary to produce an output between 1 and 1.5v p-p.

These probes should never be over-coupled as this will lead to signal distortions. The diode should, idealy, be something like a GEX66 or similar but many diodes will work. Try the OA series or a 1N914 or 1N4148 etc.



Circuit from AGAF 'TV Amateur' 3/76, by kind permission of the Editor.

N.B.T.V.

Volume 7 No.1 of the "Narrow Band TV" newsletter carries a very interesting constructional article on a NBTV disc camera. The camera uses as its disc a standard 12" LP record with the appropriate scanning and sync' holes drilled in it. Details and drawings of the mechanics as well as the electronics (which are transistorised throughout) are given. The camera, built by Mr.D.Aldridge, was shown at this years NBTV convention and created much interest.

An article entitled "Beginners Please" gives some very useful basic information on NBTV systems and techniques and places the accent on the practical side. The article, which is well written and presented, should prove a sound introduction to the newcomer.

YOUR CQ-TV ENVELOPE IS WORTH 50p.

As a special concession to members of BATC during 1982, you may include the envelope in which your CQ-TV arrived as part payment of the 1982 subscription to the Narrow Bandwidth Television Association. Only number 116 or 117 are acceptable for this offer.

Send the envelope with a crossed postal order or cheque for £1.50p, payable to "N.B.T.V.A.", to: S.Kujawinski, Treasurer, NBTVA, 54 Park Drive, Hucknall, Nottingham. NG15 7LU.

WELSH A.T.V.

The Neuadd Idris Hobbies Exhibition, which was held between the 3rd and 8th of August, had a comprehensive demonstration and display of amateur radio as a hobby and included amateur television to demonstrate one of the more unusual branches of the hobby.

The Meirion Amateur Radio Society, who put on the display, reports a high level of interest with the general public, despite the odd hiccup by the exhibition organisers. Both HF and LF band stations were operated and many contacts were made throughout the world.

GW3FDZ provided a closed circuit demonstration of amateur TV which aroused much interest and knowledgeable remarks like; "cor mum, I thought TV only came from the Beeb" and "look dad i'm on the tele"were typical of the public's general reaction. Also on display were off-air photos from the local and not so local stations.

In all around three thousand people had a look at the amateur radio/TV exhibit. A fine effort chaps (and ladies).

Publications

THE FOLLOWING ITEMS ARE AVAILABLE FROM BATC PUBLICATIONS:

AMATEUR TELEVISION HANDBOOK. Published by the BATC.
£1.50p to members, £2. to non-members.

THIS BOOK IS 'MUST' READING FOR ALL ATVers.

SLOW-SCAN TELEVISION. By B. J. Arnold G3RHI. Published by BATC. second edition. 35p plus 14p postage.

CQ-TV BACK ISSUES: The following back-issues are still available although stocks of some are low: CQ-TV 68, 77, 82, 88-97, 99-103, 105-109, 111-114

RE-PRINTS. Photo copies of any article in past issues of CQ-TV can be supplied at 10p per sheet plus postage. Payment may be made in UK postage stamps.

INDEX. All main articles in past issues of CQ-TV including page count for re-print purposes. 50p plus a large (9" x 7" min) S.A.E. Payment may be in UK postage stamps.

ALL PUBLICATIONS ARE AVAILABLE FROM:

BATC Publications.
14 Lilac Avenue,
Leicester, LE5 1FN

Would overseas members please add sufficient extra to cover the cost of postage on books ordered, especially for air mail.

AUSTRALIA

Would Australian members please note that the BATC 'Amateur Television Handbook' is available directly from the Wireless Institute of Australia at the following address; P. O. Box 150, Toorak, Victoria 3142.

The price for the book is $4.60 plus postage.

This address is for handbooks only. All orders for other publications, club sales items and membership subscriptions should continue to be sent to the U. K.

REMEMBER REMEMBER the end of December that's when subscriptions are due....

IT'S THAT TIME AGAIN CHAPS!
All your subscriptions for 1982 fall due on the first of January.
Unlike some, subs to the BATC remain at £3 for the next year (overseas members, extra for air mail - see CQ-TV115).
In the unlikely event of anyone being unsure whether or not to renew, consider if you will just some of the major hapenings and facilities brought to you during this last year;

1. An ever-larger magazine.
2. A new ATV handbook - at the right price.
3. Printed circuit boards made available to members.
4. A new BATC ATV exhibition.
5. Much stronger ties have been made with other ATV organisations and with the controlling bodies within amateur radio, (the larger the membership the stronger the voice).
6. Special offers to club members plus all the usual services, contests, rally stands etc etc.

There is no need to wait till the end of the year, RENEW NOW by sending off the slip enclosed with this issue.

Our Treasurer, Arthur Rix, is moving house,therefore as an interim measure please send subscriptions to the following address:

Mr. M.T.Crampton.
(BATC subs),
16 Percival Road,
Rugby,
Warwickshire.
ENGLAND.

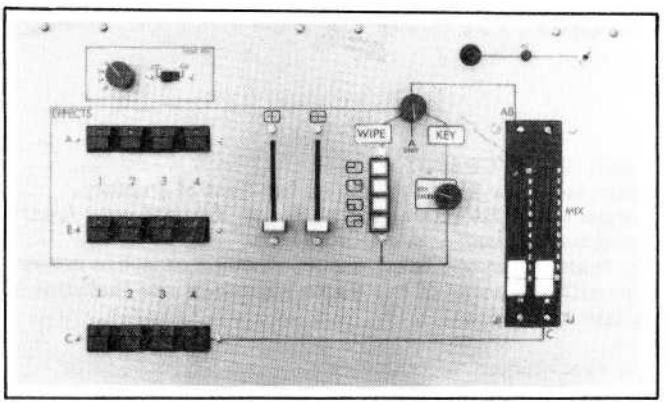
CAN YOU AFFORD NOT TO RENEW???????

Nota Bene: Members who have joined during 1981 and who have paid their next years subscription should please ignore the subscription request.

A.B.C. COLOUR MIXER

part 2

John Goode.



VIDEO EFFECTS AND MIX BOARD (Fig.6)

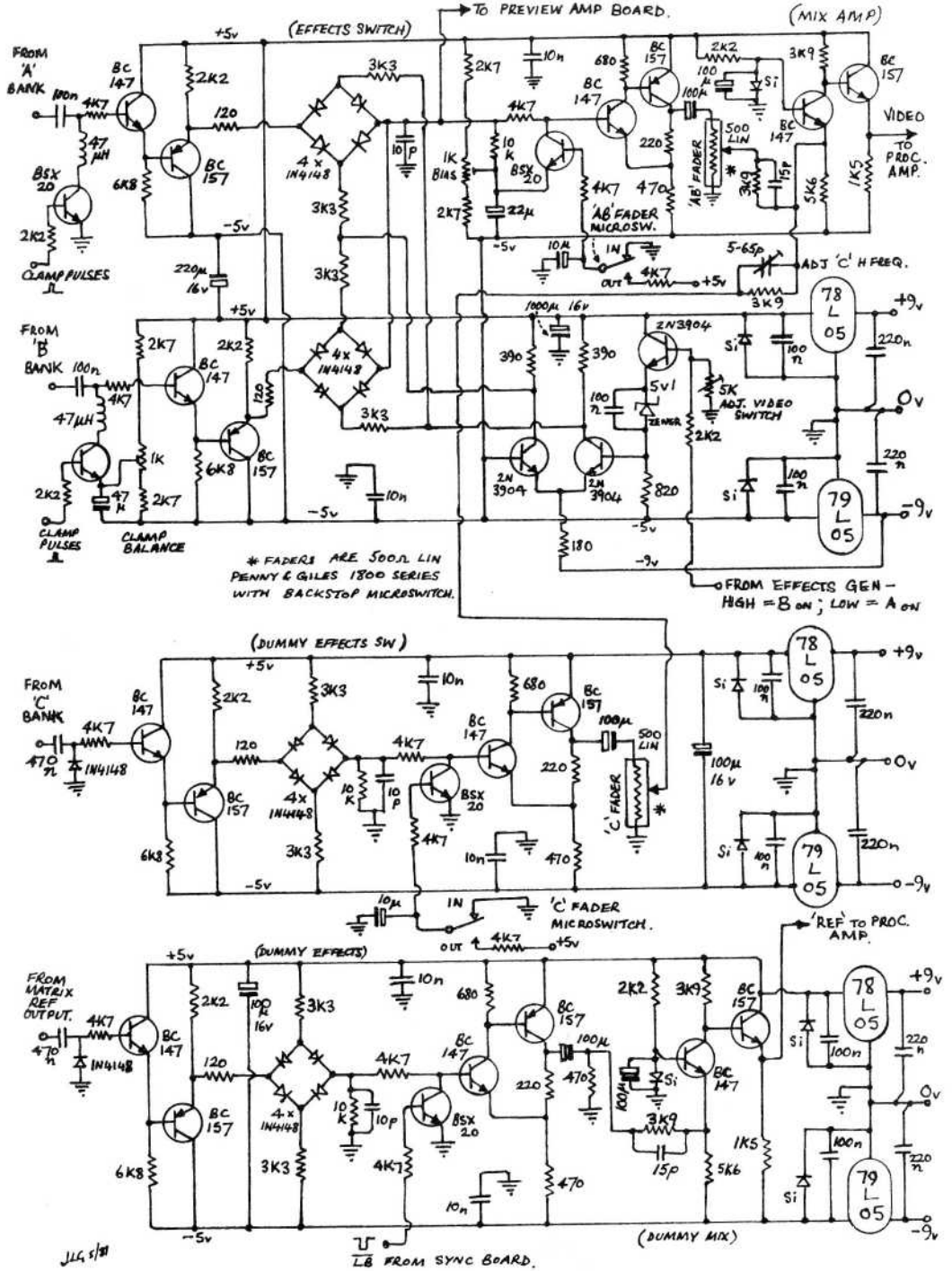
The supply to this board is ± 9volts, and has no less than six on-board low-power regulators! This is because as well as the effects-switch and mix-amp, this board also carries the 'dummy' circuits required for the 'C' and reference chains. The 'AB' chain is fed from one pair of 5 volt regulators, the 'C' path from another pair, and the ref. path from a third pair.

The effects switching is achieved using diode bridges (see "a high speed video switch", CQ-TV 112), and there are two presets, 'bias', and 'adjust video switch'. Both are adjusted to give the cleanest (transient free) switching-edge on vertical split-screen transitions. Note that in both cases extreme adjustment will result in the video switch not working, or working poorly (poor suppression of unwanted signals). However, it should be possible to achieve good results without too much trouble.

For simplicity, it was decided to use 'signal-carrying' faders rather than voltage-controlled amplifiers. However, the prototype is fitted with professional Penny & Giles 1800 series faders, with a microswitch at the 'fade-down' end. These items are rather expensive (about £13 each, plus VAT), and take three to four months delivery from the manufacturers. Less expensive slider pots could be used (say 1K lin. stereo sliders wired in parallel to give 500 ohms?), if some means of fitting fade-down microswitches could be devised.

FIG. 6 VIDEO EFFECTS & MIX BOARD

ABC COLOUR MIXER



The fader microswitches are essential in this design, as they are used to get good signal suppression at fade-out. They are used to operate electronic switches situated just before the faders (the BSX20 transistors at the effects bridges outputs), and this gives complete signal suppression when 'faded to black'.

The equivelent BSX20 circuit in the reference chain is used to suppress the active-video period, so that the ref. signal output passes only syncs and burst on to the processing amplifier. In order to do this, it is fed with negative-going line blanking (NOT mixed blanking).

EFFECTS PREVIEW BOARD (Fig.7)

A simple monochrome processing amplifier is provided to give an effects-preview output. This is fed from the effects bridge on the video effects & mix board. The supply used is -17 volts, regulated on-board to -12 volts. (A negative rail was chosen in order to even-up the current drain from the power unit.

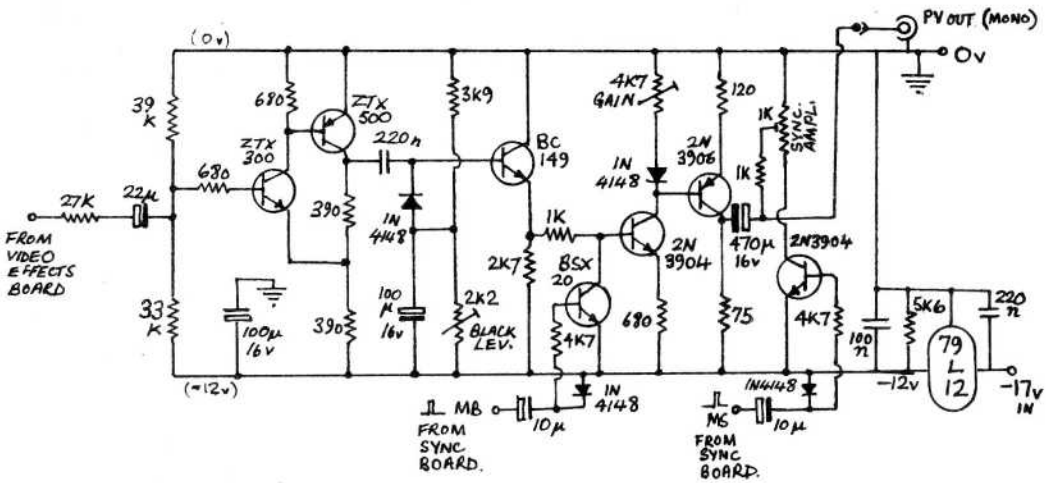


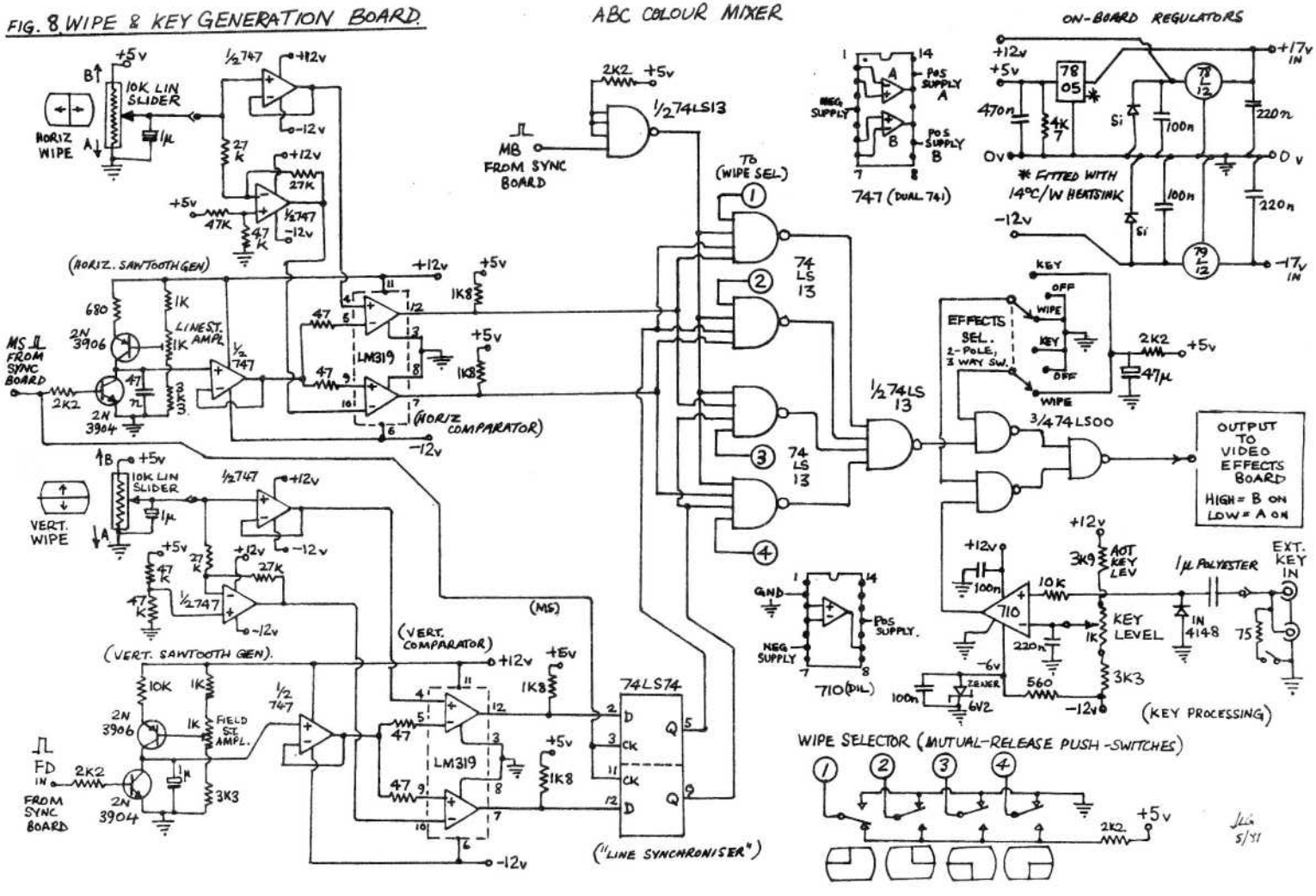
Fig.7 EFFECTS PREVIEW BOARD.

WIPE & KEY GENERATION BOARD (Fig.8)

Wipe generation is entirely conventional, being initiated by line and field-rate sawtooth (ramp) generators. These signals are applied to voltage-comparators, the reference voltages being derived from the 'WIPE' sliders. The LM319 comparators have open-collector outputs, and can therefore be made TTL-compatible by means of the 1.8K resistors connected to the +5 volt rail.

FIG. 8 WIPE & KEY GENERATION BOARD.

ABC COLOUR MIXER



The 'VERTICAL' comparators are fed to a 74LS74 dual D-type flip-flop, which is clocked by line-syncs, making sure that the vertical component of the wipe always begins or ends during the line-blanking period. The effect of this is to make sure all horizontal split-screen transitions lay along complete picture scanning-lines, eliminating the unsightly "jitter" that can occur when these transitions begin or end at a point during the active line period.

The 'HORIZONTAL" comparator and D-type outputs are then gated together to give the four standard corner-wipes, the selection being made by a four-way mutual release pushbutton bank (mechanically interlocked type).

Note that on Fig. 8, the ends of the 'WIPE' sliders are marked 'A' & 'B'. They should be physically mounted with 'A' ends adjacent to the 'A' cut-bank, and the 'B' ends adjacent to the 'B' cut-bank. If this is done the active cut-bank will be indicated by the slider knobs (when together) when the 'WIPE' mode is selected.

Because of the need for op.amps. carrying D.C. in the wipe-generator circuit, three on-board regulators are required, +12v, -12v and +5v, fed from the ± 17v supplies.

A 710 comparator is used to process the 'EXTERNAL KEY' video signal. Its output is TTL-compatible, and so a 74LS00 gate is used to select either 'KEY', 'WIPE' or 'OFF'. In the 'OFF' position, the 'B' cut-bank is not used, all selections being made on the 'A' and 'C' banks.

PROCESSING AMP. & DISTRIBUTOR (Fig. 9)

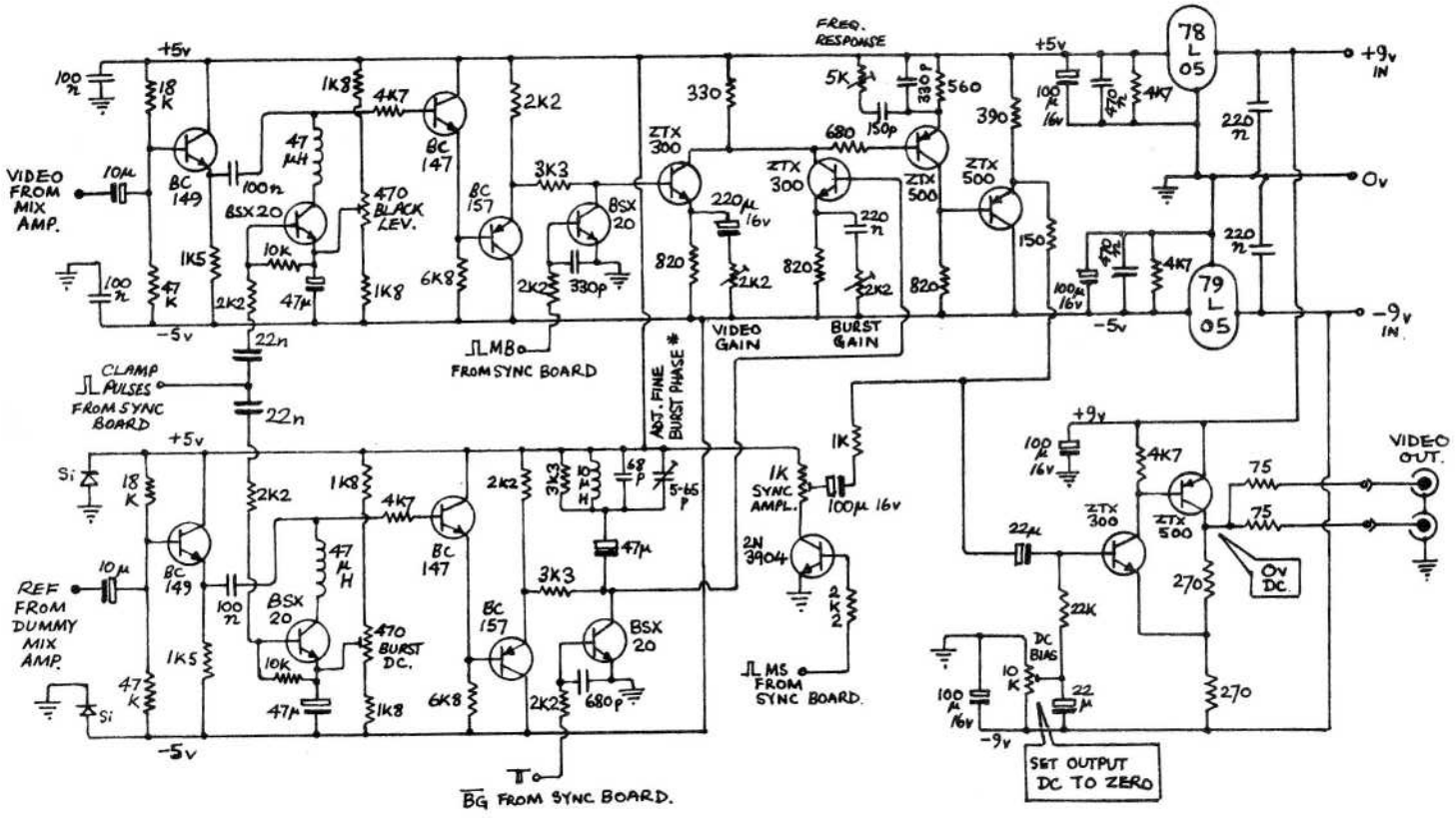
This is slightly modified compared with that published in CQ-TV 114. The blanking has been improved (better burst suppression) by removing the 100pF HF boost capacitor from the collector circuit of the BSX20 blanking transistor (similarly the burst gating circuit in the ref. chain). This is compensated for by adding a 330pF capacitor across the existing HF boosting circuit.

The burst chain has also been modified to include adjustment of burst fine-phase. This occurs by deliberate mis-tuning of the 4.43 MHz resonant circuit, and should be set using colour-bars and a vectorscope. If no vectorscope is available, tune for maximum burst amplitude (resonance), when the circuit should be purely resistive at 4.43 MHz, having no effect on phase.

The other presets should be adjusted as follows:-

1. Set output DC of distribution amp. to zero.
2. Fade to black. Set black-level, then set sync. amplitude to 0.3v p-p.
3. Set 'burst DC' to give minimum transients at the leading and trailing edges of burst. Set 'burst gain' for 0.3v p-p burst amplitude.

FIG 9 PROCESSING AMP & DISTRIBUTOR BOARD (UPDATED) ABC COLOUR MIXER.



(* BURST FINE PHASE — ADJUST FOR MAX AMPLITUDE IF NO VECTORSCOPE IS AVAILABLE)

JLG 5/81

4. Fade up colour-bars. Adjust video gain and frequency-response so that output agrees with input. If there is a discrepancy in HF response between the 'AB' & 'C' paths there is a trimmer on the video effects & mix board to compensate.
5. If a vectorscope is available, adjust burst fine-phase as above.

All the above measurements should be made with the measured video output correctly terminated in 75ohms, and with a colour-bar signal applied to input 1. An oscilloscope with a bandwidth of at least 15 MHz should be available.

DRIVE-PULSE OUTPUT BOARD (Fig.10)

This board provides 2v p-p negative-going pulses into a 75 ohm load for driving (say) a monochrome caption-camera, etc. The circuits are very straigtforward, except that the line-drive amplifier includes a differentiator to reduce the width of the input from the sync board. This is because it is, in fact, line-blanking, with a width of 12uS. The differentiation circuit reduces this to approximately 6uS, close to the CCIR system I specification.

CONCLUSION

The performance of the prototype, using BBC and IBA off-air signals appears to be excellent. Unfortunately, extensive sophisticated test equipment was not available to me, and so parameters such as signal to noise degradation, chroma noise, differential phase distortion, etc, cannot be effectively measured. However, A-B comparison tests using broadcast test card direct into a monitor, and then with the same signal fed via the mixer show no observable difference.

Should members wish to obtain P & G 1800 series faders, they should contact:- Penny & Giles Potentiometers Ltd., Grovely Road, Christchurch, Dorset. They will supply in ones and twos, but it is not certain what arrangements exist for private purchasers, as the faders I used were ordered as "spares" on an official order. The details of the faders are:-

Penny & Giles 1800 series faders.
1 off 500 ohm Lin, 'fade up', microswitch at zero end.
1 off 500 ohm Lin, 'fade down', microswitch at zero end.

The 'fade-up' and 'fade-down' refers to the bezel scale, one being from 0-10, the other from 10-0, as required for 'back to back' faders. Although expensive, they are of superb quality, and are highly recommended.

The mains transformer in the last article should have been shown as 12-0-12v with the centre tap (0) connected to ground.

The 'Schadow' push buttons refered to in part one are also available from:- Technomatic Ltd., 17 Burnley Road, London NW10 at 90p plus postage and VAT. (We are indebted to David Wilson for this information).

FIG 10 DRIVE PULSE OUTPUTS BOARD

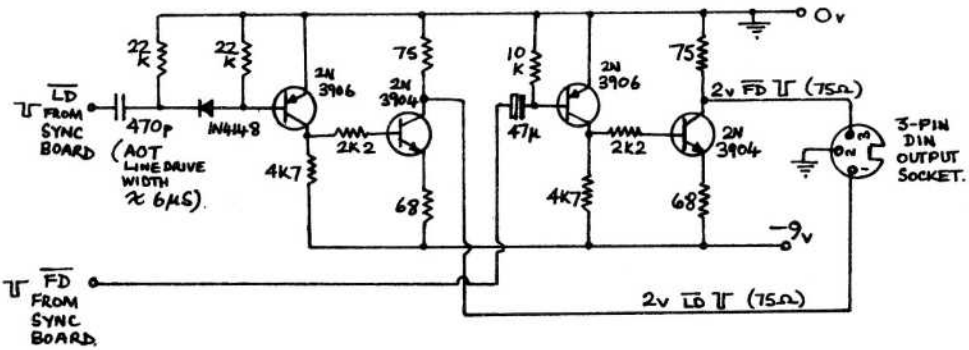
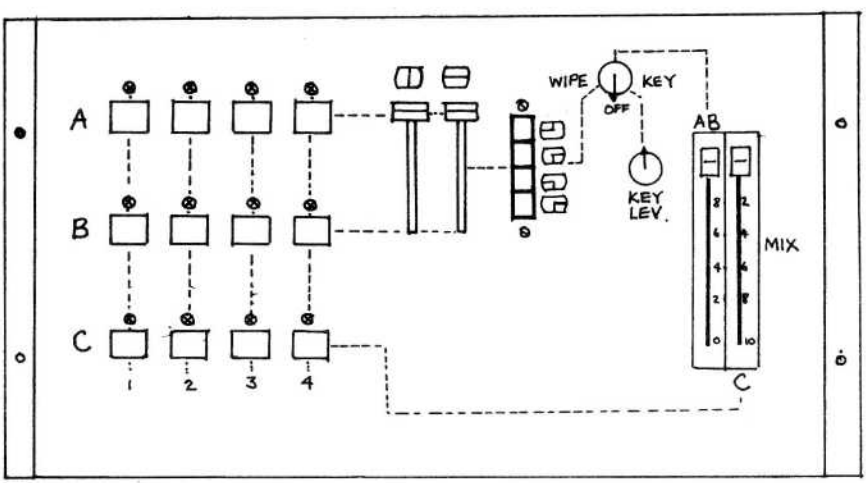
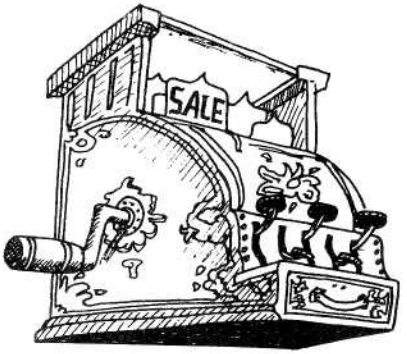


FIG 11. SUGGESTED PANEL LAYOUT, BASED ON PROTOTYPE (NOT TO SCALE).





MARKET PLACE

ADVERTISING RATES:
Classifieds - 3p per word.
Full page (cover) - £20.
Full Page (inside) - £18.
Smaller displays - proportional.

Advertisements are placed in this column free of charge to paid-up members. If possible an address label from a recent CQ-TV should accompany your ad.

FOR SALE

PHILIPS N1500 VCR, fair pictures, with 7 VC60 tapes and 1 VC30. Covers bands 1 to 6 - 625 line only, c/w instruction manual, head cleaner etc. £120.
ATARI video computer c/w 4 cartridges including invaders etc. £150.
All above would exchange for SSTV or FSTV equipment or WHY ?.
DUAL storage (stereo) Akai GXC400 cassette deck £50 or WHY ?
Bill Ball, G8XCF. 94 Faringdon Ave. Blackpool, Lancs. Tel: 0253 404459

IKEGAMI vidicon cameras (qty 2) with built-in 5" viewfinder. Fully working, c/w spare vidicon. External or internal sync, video or RF output. £75 each. (C mount lens £7 extra)
NEWTRONICS V.D.U. and P.S.U. Complete electronic caption generator. upper and lower case plus special characters. RS232 interface for microcomputer. As new £80.
David Wilson. 4 Harkness Close, Bletchley, Milton Keynes, Bucks. MK2 3NB. Tel: 0908 641234

PHILIPS DL1000 $\frac{1}{2}$" open reel video recorder (B&W) video output. Requires attention hence only £10. Also
AMPEX VR5000 1" open reel video recorder (B&W) video or RF outputs. In working order including 30 tapes and manual. £75. Buyer collects above.
Bob Glover. Tel: 01 748 7050 (Richmond)

AMPEX VR650B 2" helical-scan B&W video recorders (qty 2) with complete service information. These are 625 line 50Hz version of a machine made for the U.S. forces. One portable (but solid!) unit. One is in full working order, other minus brushgear and video pre-amp.
Sensible offers please to;
Mr. L.Dyer. Springfield Lodge, Banister Way, Shipston-on-Stour, Warks CV36 4JU. Tel: 01 736 7249

THE BATC has obtained the following TV tubes and are able to offer these to members brand new at the remarkable price of £10 each.
M38-104-GR/R, Green phosphor, ideal for computers, 90°deflection angle 28mm neck. Data available.
Lewis Elmer, G8EUP Tel: (Rugby) 0788 87324 (weekends).

WANTED

HANDBOOK/maintenance manual for Solartron C.R.O. type CD1016.
Copying facilities available.
All expenses refunded.
Derek Dunn, G8KOV. 8 Dursley Road, Dursley, Glos. Tel: Dursley 46971

MICROWAVE MODULES ATV converter. Also M/M 70cv receive converter with 28 - 30MHz IF.
John Ogden. 5 Lovers Walk, Weston Super-Mare, Avon, BS23 2AF

11" TUBE for Toshiba TV type 280TB4.
70cm transverter for Liner-2. Minimum modification type preferred.
J. Fairbairn G8AJW, 56 St. Martins Rd., Finham, Coventry, West Midlands.
Tel: 0203 415491

SLOW SCAN TV MONITOR. urgently required, prefer well known make such as Robot, Venus or Spacemark. Please send details, price etc. to;
Mr. G. Wilson. 65a Gypsy Lane, Nunthorpe, Middlesbrough, Cleveland, TS7 0DR

MONITOR scan coils for 90°deflection angle, 28mm neck tube.
J. Wood. G3YQC. 47 Crick Road, Hillmorton, Rugby, CV21 4DU.
Tel: 0788 846220

P.C. BOARDS

The following printed circuit boards and components are available from club sales:

'AMATEUR TELEVISION HANDBOOK' projects;

Wide-band 70cm tuner PCB		£3:00
Amateur television receiver PCB		£1:50
Electronic character generator PCB		£3:00
Character generator memory PCB		£3:00
Colour test card PCBs (set of 3 double sided)	p&p 50p	£15:00
Horizontal aperture corrector PCB		£3:00
Video switching unit PCB		£3:00
P.A.L. colour coder PCB		£3:00

ALL ABOVE PLUS 25p POSTAGE.

74S471 PROM. pre-programmed for colour test card circle	£10:00
TMS4036 memory IC for character generator memory	£5:00

BOTH ABOVE PLUS 20p POSTAGE

PROJECT 100.

Sync pulse generator PCB	£3:00
5 MHz and 4 fsc crystals, each	£2:75

BOTH ABOVE PLUS 25p POSTAGE.

ALSO AVAILABLE:

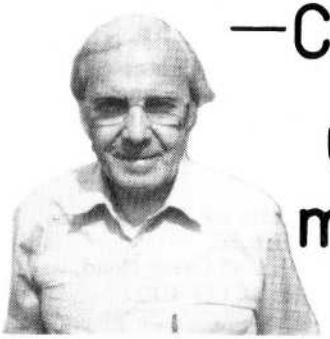
4.433618 MHz PAL colour sub-carrier crystals (surplus, untested)	.40p
Colour TV surplus delay lines	.60p

BOTH ABOVE POST PAID.

ORDERS PLEASE TO: Mr. P. Delaney (BATC Club Sales), 6 East View Close, Wargrave, BERKS RG10 8BJ, ENGLAND.

Would overseas members please allow sufficient postage or send for quote. Cheques should be drawn on UK banks only please and made payable to 'BATC'.

—CLUB SALES— under new management



GRANT DIXON

PETER DELANEY

As from the 1st of September responsibility for BATC club sales has passed to Peter Delaney, therefore all orders should now be sent to the new address which is printed opposite.

Grant Dixon was one of the early members of the BATC, joining in 1950 when the club had a membership of just over 20! Grant served as chairman for ten years and later as librarian. He took over the club sales department from Malcom Sparrow in 1968 and for the last thirteen years has maintained an efficient and invaluable service to members.

The BATC Committee, on behalf of the entire membership, expresses it's deep appreciation for the work that Grant has put in on the club's behalf over the years. The efficient and helpful way that he has operated the service has been of inestimable value both to the BATC and to it's members. We hope that Grant will now have more time to devote to his own amateur TV interests and that he will continue serving as a committee member for a long time to come.

The committee would like to welcome Peter Delaney into the fold and wish him every success in this very important job.

—BATC LIBRARY—

Grant Dixon has also passed over the club's library to Paul Marshal of 62 Rutland Road, Chelmsford, Essex. Anyone wishing to deal with the library should send all enquiries to this address.

A new list of publications held by the librarian is in course of preparation and details will be published in CQ-TV magazine in the near future.

B.A.T.C. CLUB SALES

TV CAMERA TUBES & SCAN-COILS

	price	postage
EEV Leddicon	£82.00	nil
½" E.M.I. 9777 Ebitron	£30.00	nil
2/3" E.M.I. 9831 amateur grade vidicon	£15.50	nil
1" E.M.I. 9677 amateur grade vidicon	£15.50	nil
1" E.M.I. 9728 amateur grade vidicon	£15.50	nil
4½" E.M.I. 9565 image orthicon	£10 for 2,	buyer collects
1" E.M.I. 9706 amateur grade vidicon (5" version)	£15.50	nil
1" vidicon scan-coils	£6.00	£1.10
2/3" vidicon scan-coils	£6.00	0.72
Paxolin vidicon base sockets 1" or2/3" (state which)	0.32	0.14
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